

REMARKS

In response to the Office Action dated January 13, 2006, Applicants respectfully request reconsideration. To further the prosecution of this application, the rejections have been carefully considered and are addressed below. The application is believed to be in allowable condition.

Initially, Applicants thank Examiner Iwashko and a Primary Examiner for the courtesies extended during the telephone interview of April 5, 2006. The substance of the interview is summarized herein.

Objection to the Drawings

The Office Action asserts that corrected drawings are required because Figures 1-7 are handwritten. Applicants submit herewith a set of formal drawings and respectfully request that any objection to the drawings be withdrawn.

Objection to the Claims

The Office Action objects to the word “based” at the end of the claim 4. Applicants have amended claim 4 to remove it. The Office Action further objects to claim 8 because the claim has two periods at the end. Applicants have amended claim 8 to remove one of them. In view of these amendments, it is respectfully requested that the objections to claims 4 and 8 be withdrawn.

Rejections Under 35 U.S.C. §112

The Office Action rejects claims 23, 29, and 30 under 35 U.S.C. §112, second paragraph, asserting that the phrase, “the content addressable storage system” lacks antecedent basis. Applicants have resolved this issued by amending claims 23 and 29 to depend from claim 22 instead of claim 21.

Applicants believe that these claims are clear and satisfy the requirements of 35 U.S.C. §112, second paragraph. Accordingly, it is respectfully requested that the rejections of claims 23, 29, and 30 under 35 U.S.C. §112 be withdrawn.

Rejections Under 35 U.S.C. §102

Claims 1-78 are rejected under §102 as purportedly being anticipated by Pandya. These rejections are respectfully traversed.

I. Overview Of Embodiments Of The Invention

Embodiments of the invention are directed to a content addressable storage (CAS) system, which is one by which a unit of data stored on the CAS system is accessed using an address derived at least partially from the content of the unit of data. (specification, page 1, lines 10-12). The CAS system can serve as storage for a host computer. When a host computer sends a request to the CAS system to retrieve a unit of data, the host provides the content address of the unit of data, and the storage system then determines, based on the content address the physical location where the unit of data is stored so that it can be retrieved and returned to the host computer.

The task of determining the physical location for a unit of data may have several aspects, particularly when the storage system is a distributed storage system made up of a number of separate nodes. (page 1, lines 22-23). To determine the physical location of a unit of data on such a storage system, the storage system first determines on which node the unit of data is stored, and then determines which disk on that node the data is stored. (page 1, lines 26-28).

One known method of determining which storage nodes stores a particular unit of data is referred to as a multi cast location query (MLQ) (page 2, lines 9-10). Using this technique, a message is broadcast to each storage node that stores units of data, asking if it stores the particular unit of data to be accessed. (page 2, lines 10-13). Each storage node then determines if it stores the requested unit of data, and may do so by accessing a database or table that lists the units of data stored thereby. (page 2, lines 13-17). An MLQ is a computationally expensive process, as it requires each storage node to perform an exhaustive database search for each unit of data requested. (page 3, lines 15-16).

To reduce the computational expense of using an MLQ to locate units of data on the storage system, in one embodiment of the invention, the storage system provides hints to the host

as to the location(s) where a unit of data is stored within a storage system so that on subsequent access requests to the unit of data, the host can provide the location back to the storage system to facilitate the storage system locating the unit of data, thereby increasing the efficiency of the storage system in locating the unit of data. (page 11, lines 27-31).

The foregoing overview is provided merely to assist the Examiner in appreciating various aspects of the present invention. The overview may not apply to each of the independent claims, and the language of the independent claims may differ in material respects from the overview provided above. The Examiner is requested to give a careful consideration to the language of each of the independent claims and to address each on its own merits, without relying on the overview provided above. Applicants do not rely on the overview to distinguish any of the claims of the present invention over the prior art, but rather, rely only upon the arguments provided below.

II. Claims 1-10

Claim 1 is directed to a method of processing data in a computer system comprising at least one host and at least one storage system which stores data for the at least one host. The method comprises acts of: (a) receiving, at the storage system, a request from the at least one host to access a unit of data stored on the at least one storage system; and (b) in response to the request, returning to the at least one host information related to where the unit of data is physically stored on the at least one storage system.

The Office Action asserts that Pandya discloses the receiving at a storage system of an access request from a host at ¶0124, lines 26-29. The cited portion states, “[t]he storage flow controller provides command queues where new requests from the host are deposited, as well as active commands are held in the active commands queue.” Thus, the Office Action appears to equate the storage flow controller of the IP processor of Pandya to a storage system and asserts that the host provides requests to the storage flow controller.

The cited paragraph does not disclose or suggest that the request from the alleged host to the storage flow controller is a request to access a unit of data stored on the storage flow controller. Rather, the storage flow controller includes a command queue that stores requests

received from the alleged host. Thus, in Pandya, the alleged host computer issues a request and the request is stored (presumably temporarily) in the command queue of the storage flow controller. **Pandya does not disclose that the request from the alleged host computer is a request for a unit of data stored in the storage flow controller.** By contrast, claim 1 relates to receiving at the storage system a request for a unit of data stored on the storage system. This is simply not disclosed in the cited section of Pandya.

Next, the Office Action asserts that Pandya discloses the transfer from the storage system to the host computer, in response to the access request, of information related to where the unit of data is physically stored on the storage system at ¶0124 lines 3-8. The cited section of Pandya states, “[t]he storage flow and RDMA controller block provides the functionality necessary for the host to queue the commands (storage or RDMA or sockets direct or a combination thereof) to this processor, which then takes these commands and executes them, interrupting the host processor primarily on command termination.” The cited paragraph does not even mention the storage location of a unit of data and certainly does not disclose that the storage flow controller provides to the alleged host information about where a unit of data is stored, either in response to an access request or otherwise. The cited paragraph merely discloses that the host can provide commands to the hardware IP processor so that the hardware IP processor, rather than the host processor, executes these commands. This paragraph does not even remotely pertain to a storage system providing information to a host computer related to where a unit of data is stored on the storage system.

As should be clear from the discussion above, Pandya does not disclose or suggest, “receiving, at the storage system, a request from the at least one host to access a unit of data stored on the at least one storage system” and “in response to the request, returning to the at least one host information related to where the unit of data is physically stored on the at least one storage system,” as recited in claim 1.

Thus, claim 1 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 1 under 35 U.S.C. §102(e) be withdrawn.

Claims 2-10 depend from claim 1 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

III. Claims 11-20

Claim 11 is directed to at least one computer readable medium encoded with instructions that, when executed on a computer system perform a method substantially similar to the method recited in claim 1.

Thus, claim 11 patentably distinguishes over Pandya for reasons similar to those discussed in connection with claim 1. Accordingly, it is respectfully requested that the rejection of claim 11 under 35 U.S.C. §102(e) be withdrawn.

Claims 12-20 depend from claim 11 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

IV. Claims 21-30

Claim 21 is directed to a storage system for use in a computer system that includes at least one host, wherein the storage system stores data for the at least one host. The storage system comprises: at least one storage device to store data received from the at least one host; and at least one controller that receives a request from the at least one host to access a unit of data stored on the storage system and in response to the request, returns to the at least one host information related to where the unit of data is physically stored on the storage system.

As should be clear from the discussion above, Pandya does not disclose or suggest “at least one controller that receives a request from the at least one host to access a unit of data stored on the storage system and in response to the request, returns to the at least one host information related to where the unit of data is physically stored on the storage system,” as recited in claim 21.

Thus, claim 21 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 21 under 35 U.S.C. §102(e) be withdrawn.

Claims 22-30 depend from claim 21 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

V. Claims 31-38

Claim 31 is directed to a method of processing data in a computer system comprising at least one host and at least one storage system which stores data for the at least one host. The method comprises acts of: (a) sending, to the at least one storage system, a request to access a unit of data stored on the storage system; and (b) receiving, from the at least one storage system, information related to where the unit of data is physically stored on the at least one storage system.

As should be clear from the discussion above, Pandya does not disclose or suggest “sending, to the at least one storage system, a request to access a unit of data stored on the storage system” and “receiving, from the at least one storage system, information related to where the unit of data is physically stored on the at least one storage system,” as recited in claim 31.

Thus, claim 31 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 31 under 35 U.S.C. §102(e) be withdrawn.

Claims 32-38 depend from claim 31 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

VI. Claims 39-46

Claim 39 is directed to at least one computer readable medium encoded with instructions that, when executed on a computer system, perform a method substantially similar to the method recited in claim 31.

Thus, claim 39 patentably distinguishes over Pandya for reasons similar to those discussed in connection with claim 31. Accordingly, it is respectfully requested that the rejection of claim 39 under 35 U.S.C. §102(e) be withdrawn.

Claims 40-46 depend from claim 39 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

VII. Claims 47-54

Claim 47 is directed to a host computer for use in a computer system that includes the host computer and at least one storage system. The host computer comprises: at least one storage device; and at least one controller that: sends, to the at least one storage system, a request to access a unit of data stored on the at least one storage system; and in response to the request, receives from the at least one storage system, information related to where the unit of data is physically stored on the at least one storage system and stores the information in the at least one storage device.

As should be clear from the discussion above, Pandya fails to disclose or suggest at least one controller that, “sends, to the at least one storage system, a request to access a unit of data stored on the at least one storage system, and in response to the request, receives from the at least one storage system, information related to where the unit of data is physically stored on the at least one storage system and stores the information in the at least one storage device,” as recited in claim 47.

Thus, claim 47 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 47 under 35 U.S.C. §102(e) be withdrawn.

Claims 48-54 depend from claim 47 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

VIII. Claims 55-59

Claim 55 is directed to a method of processing data in a computer system comprising at least one host and at least one storage system. The method comprises acts of: (a) receiving, at the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data; and (b) in response to the request, returning to the at least one host an identifier that can be used to access the unit of data and additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system.

As should be clear from the discussion above, Pandya fails to disclose or suggest, “receiving, at the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data” and “in response to the request, returning to the at least one host an identifier that can be used to access the unit of data and additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system,” as recited in claim 55.

Thus, claim 55 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 55 under 35 U.S.C. §102(e) be withdrawn.

Claims 56-59 depend from claim 55 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

IX. Claims 60-64

Claim 60 is directed to at least one computer readable medium encoded with instructions that, when executed on a computer system perform a method substantially similar to the method recited in claim 55.

Thus, claim 60 patentably distinguishes over Pandya for reasons similar to the reasons discussed above in connection with claim 55. Accordingly, it is respectfully requested that the rejection of claim 60 under 35 U.S.C. §102(e) be withdrawn.

Claims 61-64 depend from claim 60 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

X. Claims 65-69

Claim 65 is directed to a storage system for use in a computer system, including the storage system and at least one host. The storage system comprises: at least one storage device to store data received from the at least one host; and at least one controller that: receives, at the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data; and in response to the request, returns to the at least one host an identifier that can be used to access the unit of data and

additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system.

As should be clear from the discussion above, Pandya fails to disclose or suggest, “at least one controller that: receives, at the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data; and in response to the request, returns to the at least one host an identifier that can be used to access the unit of data and additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system,” as recited in claim 65.

Thus, claim 65 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 65 under 35 U.S.C. §102(e) be withdrawn.

Claims 66-69 depend from claim 65 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

XI. Claims 70-72

Claim 70 is directed to a method of processing data in a computer system comprising at least one host and at least one storage system. The method comprising acts of: (a) sending, to the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data; and (b) receiving, from the at least one storage system, an identifier that can be used to access the unit of data and additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system.

As should be clear from the discussion above, Pandya fails to disclose or suggest, “sending, to the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data” and “receiving, from the at least one storage system, an identifier that can be used to access the unit of data and additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system,” as recited in claim 70.

Thus, claim 70 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 70 under 35 U.S.C. §102(e) be withdrawn.

Claims 71 and 72 depend from claim 70 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

XII. Claims 73-75

Claim 73 is directed to at least one computer readable medium encoded with instructions that, when executed on a computer system, perform a method similar to that recited in claim 70.

Thus, claim 73 patentably distinguishes over Pandya for reasons similar to the reasons discussed above in connection with claim 70. Accordingly, it is respectfully requested that the rejection of claim 73 under 35 U.S.C. §102(e) be withdrawn.

Claims 74 and 75 depend from claim 73 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

XIII. Claims 76-78

Claim 76 is directed to a host computer for use in a computer system including the host computer and at least one storage system. The host computer comprises at least one storage device; and at least one controller that: sends, to the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data; and in response to the request, receives from the at least one storage system an identifier that can be used to access the unit of data and additional information, separate from the identifier, related to where the unit of data is physically stored on the at least one storage system, and stores the additional information on the at least one storage device.

As should be clear from the discussion above, Pandya fails to disclose or suggest, “at least one controller that: sends, to the at least one storage system, a request from the at least one host to access a unit of data, the request having an identifier that can be used to access the unit of data; and in response to the request, receives from the at least one storage system an identifier that can be used to access the unit of data and additional information, separate from the

identifier, related to where the unit of data is physically stored on the at least one storage system, and stores the additional information on the at least one storage device,” as recited in claim 76.

Thus, claim 76 patentably distinguishes over Pandya. Accordingly, it is respectfully requested that the rejection of claim 76 under 35 U.S.C. §102(e) be withdrawn.

Claims 77 and 78 depend from claim 76 and are patentable for at least the same reasons. Accordingly, it is respectfully requested that the rejection of these claims be withdrawn.

CONCLUSION

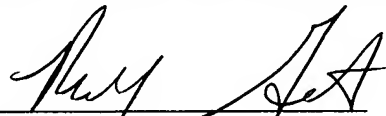
In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

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Respectfully submitted,

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